Lightweight Design of an HTS Coil for the VASIMR Experiment, Phase II

Completed Technology Project (2004 - 2006)

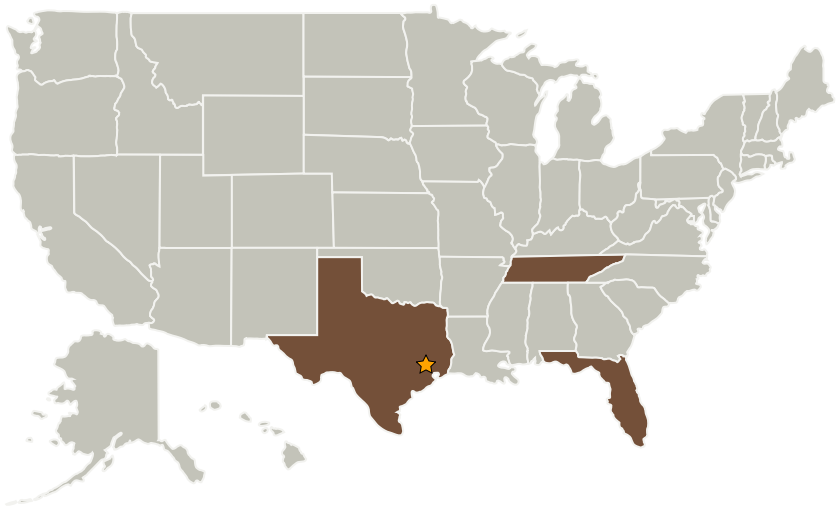
Project Introduction

In this Phase II SBIR contract Tai-Yang Research Company of Tennessee proposes to design, fabricate, and test an ultra-lightweight High Temperature Superconducting (HTS) magnet utilizing Chemical Vapor Deposition (CVD) diamond technology. The proposed CVD/HTS magnet will combine ultra-lightweight and ultra-high reliability and thermal stability. When built, the CVD/HTS magnet will be the most technologically advanced conduction-cooled HTS magnet ever constructed.

Anticipated Benefits

Potential NASA Commercial Applications: Commercial sales of superconducting magnets represent over a $ 3 Billion per year industry. The two largest commercial existing markets are MRI and NMR, both of which are used by the medical and bio-technology industries. Most other potential commercial applications stem from the electric utility industry and inlcude: transformers, ac/dc motors, ac/dc tranmission cables, generators, flywheels, fault-current-limiters, and magnetic separators. To date, successful HTS based prototypes have been fabricated for most electric utility functions. If technically and economically viable, HTS enabled products are forcasted to be over a $ 10 Billlion dollar industry by 2010.

Primary U.S. Work Locations and Key Partners



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Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
Energy to Power Solutions	Supporting Organization	Industry	Tallahassee, Florida
Tai-Yang Research Corporation	Supporting Organization	Industry	Knoxville, Tennessee

Primary U.S. Work Locations	
Florida	Tennessee
Texas	

Project Transitions

November 2004: Project Start

November 2006: Closed out

Closeout Summary: Lightweight Design of an HTS Coil for the VASIMR Experiment, Phase II Project Image

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

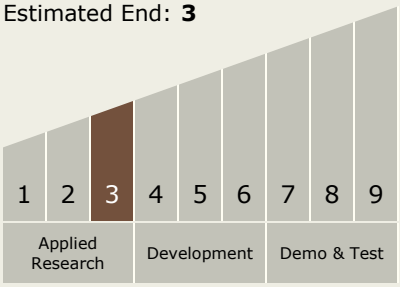
Carlos Torrez

Principal Investigator:

Christopher M Rey

Technology Maturity (TRL)

Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX14 Thermal Management Systems
  - TX14.1 Cryogenic Systems
    - TX14.1.3 Thermal Conditioning for Sensors, Instruments, and High Efficiency Electric Motors